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HOLOTHURIANS OR SEA SLUGS.

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WE are so much in the habit of associating hardness of the external parts with the Sea-urchin, the Starfish, or the Brittle-star that it is not at first sight easy to believe that the soft-bodied Sea-slug belongs to the same great division of the Animal Kingdom as the forms just named. There are, however, very good reasons for placing the Sea-slugs or Holothurians (in the same division of the Echinodermata with the Urchins (Echinoids), the Starfishes (Asteroids), or the Brittle-stars (Ophiuroids).

If we put our knowledge of the fact that a number of these echinoderms have hard outer skins into a generalised form, we should say that the Echinodermata had deposits of lime-salts in their integument; this is as true of nearly all Holothurians as it is of other members of the group; the striking difference is that these deposits in the Sea-slug are not, as a rule, continuous; they do not form a compact test, the parts of which fit close to one another as they do, for example, in the Urchin, nor do they form a lattice-work, as in the Starfish. As an ordinary rule, the calcareous deposits are scattered spicules, which may be rod-like, cup-shaped, or discoid, like wheels or anchors; sometimes, indeed, they form, as in *Psolus fabricii*, a continuous arrangement of tile-like scales on the dome-shaped upper surface; and, on the other hand, they sometimes are altogether absent, or disappear with the advance of age; it is obvious that they must be reduced to a minimum in those species which are

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edible—the Bêches-de-mer, or Trepangs, which are so abundant in the Eastern Seas, and so much relished by the gourmands of China.

The possession of calcareous deposits is but one of the two leading characteristics of the Echinodermata: when we compare a Starfish with a Crayfish we see that, while the latter has a definite right and left side, or is bilaterally symmetrical, a Starfish has a number of arms or rays, or exhibits a radial symmetry: and in the next place we observe that, though there are exceptions, such as in the case of the common Sun-star of our own shores, yet the ordinary rule is that these rays are five in number. Further, if we look to the lower surface of a Starfish, we note that along the rays there are arranged double rows of little tubes or suckers, and if we examine a Sea-urchin we see that the rows of suckers are separated by inter-radial spaces in which there are no suckers. Now, if we examine a typical Holothurian, such as a *Cucumaria* (fig. 1) we find that there are here five equidistant double rows of suckers, which mark the five rays and are separated from one another by bare interradial spaces.

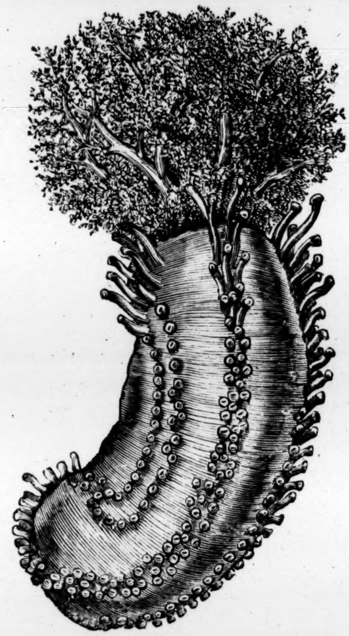

Fig. 1.—A Holothurian, *Cucumaria planci*, with the buccal tentacles expanded. Twice the natural size (Cassell's 'Natural History,' vol. i. p. 72).

In the possession, then, of a quinqueradiate symmetry and of calcareous deposits in its integument a Holothurian conforms to our idea of a typical Echinoderm.

The mouth is placed at one end of the body and the vent at the other; round the mouth is a circlet of tentacles, which in the simplest cases are ten in number—that is, there are five pairs; these tentacles may be withdrawn into the body, and in some cases this retraction is aided by five radially placed muscles. At the base of these tentacles is a circular vessel, containing a fluid and giving off branches to the tentacles, and five larger trunks which run along the rays of the body, and communicate with the suckers; this circular vessel, with its tentacular and radial branches, makes up one of the most characteristic structures of Echinoderm organisation—the system of water-vessels. In the Starfish it communicates directly with the exterior by a canal which opens on the upper surface of the body, but which in the Sea-slug hangs freely in the body cavity and draws its water thence. On the circular vessels and its trunks there are swellings or sacs with contractile walls, and it is by the action of these that the water is propelled through the system; when it is driven into the tentacles or the suckers these parts are forthwith erected.

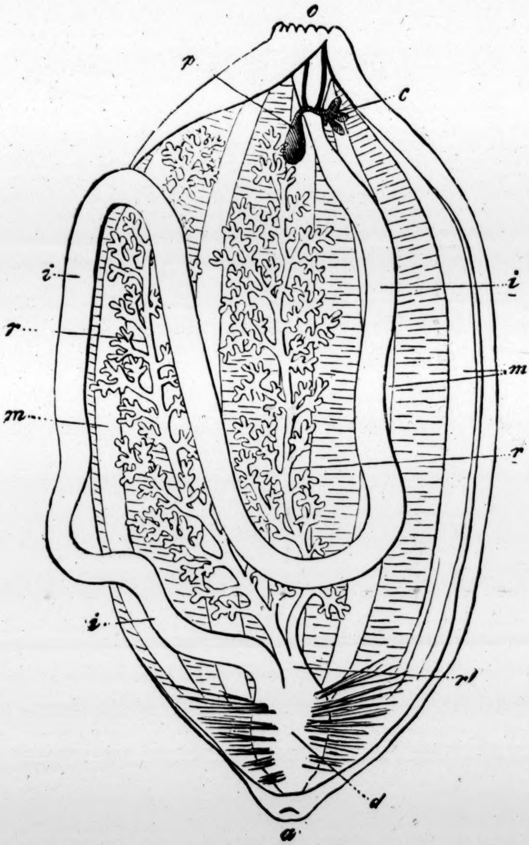

Fig. 2.—Internal Structure of a Holothurian. *o*, Mouth; *i*, Intestine; *d*, Cloaca; *a*, Vent; *c*, Branched stone-canal; *p*, Polian vesicle; *r r*, Lungs; *r'*, their point of insertion into the Cloaca; *m*, Longitudinal muscle. (From Gegenbaur, 'Comparative Anatomy,' Bell's translation, p. 215.)

The intestine is looped and opens by a vent at the end of the body opposite to the mouth; its walls are exceedingly delicate, and owing to the fact that the contents are often sandy and gravelly, or composed of calcareous *débris*, they are frequently found to be broken in preserved or dissected specimens. When irritated or alarmed a Sea-slug ejects its intestines, but by no means dies on account of this apparently suicidal act; just like all other Echinoderms it possesses a power of repair amply sufficient to make up for even the most remarkable acts of self-mutilation.

In *Cucumaria*, and in a large number of Holothurians, there are connected with the cloaca, into which the intestine opens, a pair of elaborately and exquisitely branched delicate tubes which extend far forwards into the body; into these water passes from the exterior and is again driven out; as this supply of fresh water brings with it oxygen, and as this oxygen is only separated by a thin wall from the carbonic acid gas in the body cavity an exchange of gases is effected—the water giving up its fresh oxygen, and taking away the carbonic acid or waste product;* owing to this respiratory function the branched tubes are called "lungs."

There is only one other organ of the Sea-slug to which reference need be made here, and it also is connected with the walls of the cloaca; it consists of a system of blind tubes which may be very small or very large in number, and may form a compact mass, be branched, or whorled in arrangement. These tubes, which we know by the indifferent name of Cuvierian organs, have had very various functions ascribed to them at different times; it is now certain that, as shall be shown later on, Prof. Semper's supposition that they were organs of offence is correct.

Slight as our knowledge of Holothurian organisation is from this sketch, it is sufficient to enable us to understand the principles on which the group is classified; to the consideration of its arrangement we will, therefore, now proceed, taking on our way opportunities of saying a few words about the more interesting examples which are to be found in our own seas.

If we start with such a typical form as the *Cucumaria* which has formed the basis of the preceding account, we find we have had to do with an elongated animal whose body is divided by five rays into five parts, that the suckers are confined to the rays, that there are five pairs of tentacles, and scattered spicules in the integument; there are five retractor muscles for the tentacles, and branched lungs.

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* Compare "Some of the Ways in which Animals Breathe," Zool. 1886, pp. 305—318.

Several species of *Cucumaria* are found in the British Seas, but one only is of large size; that is the sausage-shaped creature which E. Forbes called the Great Sea-cucumber (*Cucumaria frondosa*) and the Tangle Sea-cucumber (*C. fucicola*), in his well-known work, these being synonymous terms. This species has been found as far north as Greenland, and lives in North American as well as North European waters. Dr. William Stimpson, the well-known American naturalist, states that it makes very palatable soup.

The first change from the typical *Cucumaria* is seen in the modification of the tentacles, one pair of which becomes smaller than the other four; this is to be observed in some species of *Cucumaria* itself. The next step is the scattering of the suckers, which are no longer confined to the lines of the rays, but distributed apparently irregularly over the whole of the body; this also is found in what some naturalists still call *Cucumaria*, though Dr. Lampert the author of a recent monograph of the group, has proposed for such Sea-cucumbers the new generic term of *Semperia* * — a name given, it need hardly be said, in honour of the distinguished professor of Würzburg, who during his now classical travels in the Philippines devoted much attention to the Holothurians; in our own seas the common *Thyone* (*Thyone papillosa*) is an excellent example of a form in which the suckers are scattered over the whole body, or take on what systematists call a sporadipod arrangement.

In another set of forms the integument becomes very heavily armed with calcareous plates, and the body is consequently always of the same form, and not variable like the Great Sea-cucumber. The Sea-girkin (*Ocnus lacteus* and *O. brunneus* of Forbes being synonymous terms) is one good example of this; another is presented by the Snail Sea-cucumbers (members of the genus *Psolus*), though here the species vary a good deal in the extent of their armature, the circumpolar *P. fabricii* being much richer in large plates than the *P. phantapus* which is found in our own seas. Another remarkable peculiarity in

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* New, that is, for Holothurians; it has long been used amongst Mollusca, and if the generic division be allowed to stand, it must be altered for Echinoderms.

Psolus is the fact that the suckers are confined to the lower (trivial) surface, and that the movement of the creature is, therefore, in a way comparable to that of the snail.

We may now pass to another group in which lungs are likewise found, but in which there are no special retractor muscles for the tentacles, and these organs, instead of being branched as in *Cucumaria* (the Dendrochirotæ), are stouter and shield-shaped (Aspidochirotæ). The best known genus of this group is *Holothuria*, of which, though there are a large number of species, only two are to be found in the British Seas; *H. intestinalis* has only been dredged in the Minch, and *H. nigra* is found in the English Channel off the coasts of Devonshire and Cornwall.

It is to the latter species—which has various local names, but is best known as the "Nigger" or the "Cotton-spinner"—that we owe our certainty as to the function of the Cuvierian organs. *Holothuria nigra* has been called the Cotton-spinner from its habit of shooting out from its hinder end white tubes which swell up in the sea-water, and become exceedingly sticky, so that an object—such as a crab—which becomes covered with them finds it exceedingly difficult to set itself free. This pernicious habit causes this Sea-slug to be held in great detestation by fishermen. The tubes may be drawn out to twelve times their own length, and at the same time they swell up to seven times their original diameter; six of these tubes, drawn out to be so thin as to be scarcely visible, are sufficient to hold up a weight of nearly 1000 grains. It is easy to understand the effect such powerful, tenacious, and extensile threads must have on any object which they attack.

While all these forms are provided both with feet and with lungs there are other Holothurians which depart more widely from the Cucumarian type; in some lungs, but no suckers, are developed, and in others neither lungs nor suckers, either radial or scattered, are to be found. Of the former of these two groups, of which *Molpadia* may be taken as an example, we have no representatives in our own seas; of the latter there are two which are well known—*Synapta inhærens* and *S. digitata*. At first sight these creatures appear to be very different from our typical *Cucumaria*, owing to the fact that the quinqueradiate symmetry is no longer marked by the tube-feet externally or their vessels internally, so that they appear as bilaterally symmetrical as many worms; they still, however, have calcareous deposits in their integument, *Chirodota*, an allied genus, having little rounded structures which look like toothed wheels, and *Synapta*, having fenestrated plates to which a projecting anchor-shaped spicule is attached; it is to the projecting ends of these anchors that the skin of *Synapta* owes its peculiar roughness. Though larger than *Chirodota*, *Synapta* never reaches in our own seas to the size of more than a few inches, but in the tropical seas the species of this genus may attain to a great length, being even as much as seven feet long. *Synapta* is remarkable among Echinoderms for having the sexes united.

A group of curiously modified Holothurians have been made known by the recent explorations in deep water, but as the Elasipoda are confined to great depths, and an enumeration of their characteristics would obscure these leading facts in Holothurian organisation which it is the purpose of this paper to describe, we must postpone any notice of them to another occasion.

During the last few months some of the more leading types of Holothurians have been set out in spirit for exhibition in the Starfish Gallery of the British Museum (Natural History). What are to be seen there are such forms as every reader of 'The Zoologist' ought to know a little about, but they do not, of course, give any idea of the extent of the National Collection of these animals. Comparatively rich as that collection is, it is certain that it still wants a number of described forms, and that there are still many Holothurians in the sea which have never yet been named or described. If this little paper should excite the interest of any reader in these instructive and incompletely known animals he may give a proof thereof by devoting his leisure to their collection; in justice, however, it must be said that the appearance of his preserved specimens will not give the brilliant results that fall to the collector of birds or insects. Holothurians have an irritating way of ejecting their viscera or of breaking to pieces; the best way, therefore, to kill and preserve them is to plunge them at once into spirit; before the specimens are packed off and sent to the Museum it is well to completely change this spirit, as it soon becomes weakened by the quantity of water in the Sea-slug's body.

NOTES ON A VOYAGE TO THE GREENLAND SEAS IN 1886.

By Robert Gray.

[The following notes, which I hope may prove of some interest to your readers, have been extracted from my journal of the voyage of the s. s. 'Eclipse' of Peterhead, David Gray, Master, to the Greenland Whale Fishery last season. I may state here that in former years the 'Eclipse' had left Peterhead regularly for the Greenland Seal and Whale Fishery early in March; but the small number of Seals obtained during the last few years at the Seal-fishing, and the low price to which Seal-oil had fallen, rendered the chance of obtaining a sufficient number of Seals to defray the additional expense incurred in their capture so uncertain as to cause the owners to delay the vessel's departure to the date mentioned below, sending her out therefore with the intention of prosecuting the Whale-fishing alone. —R. G.]

Leaving Peterhead on April 20th, the 'Eclipse' the day following arrived at Lerwick. While here fifteen Shetland men were shipped to complete our crew of fifty-five hands all told. Sundry preparations being completed, on the forenoon of the 22nd the 'Eclipse' got under way, and before the sun set the lofty cliffs of Noss faded dimly in the distance astern.

The 23rd saw us well clear of land; already we noticed with interest unmistakable signs of our advance to the northward. Seventy miles N. of Lambaness the first Mallemokes, *Procellaria glacialis*, were seen; some thirty miles further north several schools of Bottle-nose Whales, *Hyperoodon rostratus*. They appeared to be feeding—not on their northward journey, as we have noticed them year after year in the same latitude, some six weeks earlier in the season. Also a few Kittiwakes, *Rissa tridactyla*, and Gannets, *Sula bassana*, were noticed, and just before dark a small bird, believed to be a Snow-flake, *Plectrophanes nivalis*, was seen fluttering about the rigging, but unfortunately it was not captured to prove its identity.

Continuing to steam to the northward we experienced remarkably fine weather until the evening of the 24th, when the wind freshened from the northward, and the sea began to rise. In the evening a few Bottle-nose Whales were seen going southwards, and at the same time a Killer Whale, *Orca gladiator*, easily recognised by the height of its dorsal fin, pursuing a similar direction. The wind continued adverse throughout the 25th, so that we made but little progress. Some Porpoises, *Phocæna communis*, were seen in the afternoon, the first I had seen so far north: I apprehend therefore that they were beyond the northern limit of their range.*

On the 26th and 27th we had light head-winds with frequent showers of snow. Crossed the Arctic Circle on the latter date, and noticed the first Looms, *Alca arra*, and Rotches, *Mergulus alle*; also a few Bottle-nose Whales and one large Finner, most probably *Balænoptera sibbaldii*. On the evening of the 28th the brightness of the northern sky indicated our approach to the ice, and as we advanced towards it the temperature of the water, which had previously stood for some time at 39°, began to fall, slowly at first, more rapidly afterwards, until it stood at 29° F., when we were within half a mile of the ice itself. The "West Ice," as it is called by the whalers, lying along the east coast of Greenland, northwards from Cape Farewell, renders its shores ice-bound throughout the entire year, and thus limits the extent of open water to the westward. Our position being lat. 70° 14′ N. and long. 2° 23′ W., the position of the ice-edge this season may be considered normal. Schools of Bottle-nose Whales seen in the afternoon, and at midnight we watched two large Finners playing about the ice-edge. By their bluish grey colour and by the diminutive size of their dorsal fins I at once recognised the *B. sibbaldii*. I will embrace this opportunity of correcting a statement in the 'Arctic Voyages of A. E. Nordenskiöld' (p. 52). The author says:—"It is probable that 'Finners' never live in colder water than 2·5° C. (= 36·9° F.), and that the northern limit of their distribution coincides with sea of this temperature." It is a fact well known, to those on board the 'Eclipse' at least, that this whale (*Balænoptera sibbaldii*) is found in water quite as cold as any other, *Balæna mysticetus* not excepted. I have seen it in water below 32° quite as often as above it, and the reader by referring to the Table appended will see how often the temperature of the water was below 36°, and how often above it on the days in which it is mentioned. Hereafter I hope to show that its northern distribution, instead of being restricted to a line of temperature at once arbitrary and unreasonable agrees more nearly with the southern distribution of *Balæna mysticetus*, and as the vanguard of the latter retreats to the northward the vanguard of *B. sibbaldii* advances to occupy the ground left vacant.

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* For latitudes and longitudes, temperatures, &c., see Table appended.

Having now reached the ice, it remained for us to proceed northwards towards the whaling ground; but as some time yet remained before we could expect to see whales, we hoped to pick up a few old Saddle Seals, *Phoca grœnlandica*, on our way north, and for this purpose the examination of each successive point of ice was commenced. By way of explanation, I may state that in the month of March, the Saddle Seals, male and female, come from the northward and southward, along the ice-edge, and, owing apparently to the formation of the latter, they converge towards a great point of ice, which in a normal season lies along the 73rd parallel of latitude, and runs out beyond the meridian of Greenwich. Here meeting, the united body of seals direct their course inwards, until ice is found suitable for their purpose They now take the ice, and soon afterwards the young seals are born. On the 3rd of April, at what might be called a critical period in the history of the seal, the close-time ends, the sealers are at liberty to kill them, and before the creatures are many days old the whole "pack" is generally slaughtered before their mother's eyes. And what for nearly two hundred years has proved a sure and certain source of annual wealth, the support of an extensive industry, is—unless legislation comes speedily to its rescue—doomed to almost complete annihilation, by the greedy, short-sightedness of man. Towards the end of April the few young Saddle Seals which have escaped this wasteful destruction, having cast their snow-white fur, and assumed instead a coat of steel-blue hair, marked over with small dark spots, are now able to provide for themselves. Abandoned to their own resources, the "spots" as they are called, betake themselves towards the sea, and dispersing along the ice-edge are seen, alas! too infrequently! lying on the small outlying pieces of ice near the pack edge, enjoying the bright sunshine, and the warmth of the summer air. Before the young seals have taken to the water, the males commence seeking the females; pairing having taken place, all the old Saddle Seals abandon the locality, and, dividing into droves or herds, disperse both north and south along the ice edge. Selecting the outlying "streams" and "points," the old seals again take the ice, and the hunting of them constitutes the "Old Saddle Sealing." A good many "Finners," *B. sibbaldii*, were seen on the 29th, and many Looms flying eastward, as we afterwards discovered, for the next point of ice. A few "spots" (young Saddle Seals) were seen on the 30th, and one Great Skua, *Stercorarius catarrhactes*, was for some time seen following in the ship's wake. This is only the second bird of this species of Skua I have seen in these seas during the last four seasons.

May 1st. "Finner Whales," *B. sibbaldii*, numerous in the evening. Having crossed a deep bight, May 2nd found us at another point in lat. 75° 1′ N., long. 0° 42′ W. Continuing our way northward, the same evening we passed a Norwegian steamer, lying amongst the ice, engaged in sealing. On the morning of the 3rd a patch of old Saddle Seals was discovered, numbering about 5000: they were scattered over a strip of ice some three miles in length by one in breadth: as many as fifty seals might have been collected on one single piece of ice. The boats, eight in number, were manned and sent away. Every shot drove hundreds off the ice, and in a remarkably short time the whole herd was driven into the water. After going a few miles to the northward they again went on to the ice in considerable numbers; their coats, however, not having had time to dry before they were again attacked, they required even less persuasion than before to return to their watery element. A heavy swell amongst the ice made shooting difficult, and kept the seals continually awake. All day they continued howling and screeching in the most melancholy manner, the sure and certain sign, the seamen said, of bad weather. Having bagged some 120 seals, the boats returned on board, and we made sail and proceeded northwards. One Narwhal seen; Snow-birds, *Larus eburneus*, and Burgomasters, *Larus glaucus*, numerous as these birds always are when seals are in the neighbourhood.

A heavy gale from the N.E., with showers of snow, blew on the 6th; having found shelter under lee of a point of ice, we lay comfortably under storm canvas. During the afternoon a small bird was noticed fluttering about the rigging; some time afterwards it was seen crouching under lee of the weather bulwarks, its feathers puffed out to their full extent; latterly it found its way underneath the forecastle-head, where, protected from the inclemency of the weather, it soon fell into its last long sleep.

On examining it I found it to be a Wheatear, *Saxicola œnanthe.* Our position was lat. 77° N., long. 1° W. Numbers of old Saddle Seals were seen coming from the S.E. on the 6th, undoubtedly having been washed off an outlying "stream," and now returning to the main ice. On the 7th, the s.s. "Hope," of Peterhead, spoke us. We learnt from Capt. J. Gray, that the young Saddle Seal fishing had proved a complete failure. Comparatively fine weather was experienced until March 25th, when the weather changing for the worse, a succession of heavy north-easterly gales set in. Several of the Norwegian vessels were almost ashore on Jan Mayen, and one Scotch vessel, the 'Polar Star,' was driven as far south as Iceland (a distance of 400 miles), where she narrowly escaped being wrecked. The strong winds had also the effect of separating the ice, and necessarily also of dividing the seals into a number of separate patches. Owing to the severity of the weather the ships were unable to lower their boats until the 7th of April. The consequence was that the young seals were older than usual before being killed, and therefore in better condition. The seals were found in lat. 74° N., long. 2° E., at the extremity of the "point" already referred to, a few miles from the sea. Twenty-one Norwegians and three Scotch vessels were present, the former captured about 31,600, the latter about 4500 "white coats" (young Saddle Seals), besides these, a few old Saddle Seals were captured, perhaps 4000. In round numbers, the twenty-four vessels present captured a total of 40,000 seals, old and young, an average of 1600 per ship, certainly quite insufficient to pay expenses, and undoubtedly the poorest young Saddle Sealing as yet recorded.

Towards the evening of the 8th the weather moderated sufficiently to allow us to proceed. After "fishing" several patches of seals which we discovered on our way north, the 14th found us in lat. 78° approaching whaling-ground. On the 11th, amongst a patch of seals, a young Saddle was noticed lying on the ice, still wearing its snow-white coat. By the 15th, after several days work, the necessary preparations for whaling were completed. 600 fathoms (= 1,200 yards) of line were carefully coiled into each boat, harpoons were spliced on to the lines, harpoon guns fixed in the boat bows, &c. The day following we spoke the s.s. 'Erik,' of Peterhead. Capt. A. Gray reported having been north in whaling-ground since April 25th; on April 30th one whale was seen (exceptionally early), but no others since then.

The North Greenland whaling-ground lies to the northward of the 75th parallel, to the westward of a line running obliquely north eastward, from the intersection of the latitude mentioned, by the meridian of Greenwich, to Amsterdam Island off the west coast of Spitzbergen. In the area whose south-eastern limits have been described, the margin of the Greenland west ice lies. Its sinuous outline presents a succession of points and bays, outlying "streams" and deep recesses. Among these the Greenland Right Whale makes its appearance about the middle of May, coming apparently from the S.W. They appear to come up through the very heart of the Greenland ice, finding breathing room in the lanes and open spaces of water, which are continually breaking out and closing again amongst the floes, perchance occasionally finding sporting-room in some large "polynia," far removed from the sea. Diverted apparently from their northern course by encountering a close barrier of ice, running obliquely across their path as they advance northwards, they are gradually forced to the eastward, until reaching lat. 78° they make their appearance at the sea edge. Here they resort during a variable period, from a month to six weeks or even less, in the months of May and June. Owing apparently to the opening of the obstruction referred to, they leave as suddenly as they made their appearance, are last seen going N.W., and the North Greenland whaling is over for the season.

After working north-eastward along the margin of the ice, on the evening of the 18th our further progress northward was prevented by a sudden alteration in the line of the ice-edge; hitherto its direction had been about N.E., now it ran eastwards for some distance, then taking a sweep to the S.E. it ran in upon the north-west coast of Spitzbergen. The ice lying east and west, forming the angle just referred to, is known as the "barrier," its origin being believed to be distinct from that of the west ice. Certainly its position remains almost unchanged throughout the season, and northerly winds have but little power in opening out its southern face. Most probably this ice owes its position to an easterly current, which carries it westward along the southern shores of Franz Joseph Land, round the north end of Spitzbergen, and hence into the Greenland Sea.*

Easterly winds having prevailed the ice was exceedingly tight, and there was that want of outlying "points" and sheltered "bights" which forebodes a bad season. Narwhals were very numerous, flocks of Looms and Rotches were flying hither and thither, Snow-birds and Burgomasters were flying overhead. Mallemokes followed in our wake. No whales making their appearance at the "barrier," accompanied by the 'Erik' and the 'Polar Star,' we took advantage of a northerly wind and ran south to try our luck in the next "bight." On the morning of the 19th, while lying becalmed a few miles off the ice-edge, a whale suddenly made its appearance alongside the 'Erik,' and her boats took it. The colour of the water was grass-green. Looms were very numerous. At noon of the same day, a breeze springing up from the S.E., and the ice being slack to the westward, we made sail and ran through it. Towards evening the wind increased to the force of a gale, and next morning, after having ran N.W. for about fifty miles, we tacked at the edge of the "fast ice," consisting of hard packed floes, then lay. The wind died away about noon and thick fog set in; at night a strong breeze sprang up from the westward, and clearing the fog away we found ourselves lying in an open space of water, circular in shape, some ten miles in diameter; the ice appeared to have completely closed behind us to the eastward; large floes were lying in sight to the westward. The colour of the water still continued grass-green, and contained abundance of whales' food, chiefly *Calanus Finmarckicus.* On the 21st a small whale made its appearance, evidently coming from the S.E., and was captured by the 'Polar Star."

The westerly wind continuing, it began to tell on the tightness of the ice to the westward. A vast expanse of open water had broken out amongst the floes, and our room becoming somewhat circumscribed, after some trouble we succeeded in entering it. The water, clear and cerulean, contained no life; not even a bird was to be seen.

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* Might I suggest that the wreckage of the 'Jeannette,' United States Exploring Vessel, found on an ice-floe, near Julianhaab, South Greenland, came by this route, rather than by a north-western.—See 'Nature,' December 4th, 1884.

Against strong northerly winds we now commenced to work our way back again to the "barrier." On the 24th, while plying northwards against a strong breeze, a short sharp sea or heavy "wind-lipper" running, a whale was discovered about a hundred yards from the ship, apparently lying asleep—a black object resembling in size and shape a fisherman's buoy was all that appeared above water. Perfectly motionless, it had no apparent inclination to rise to the sea, the short sharp waves washing freely over it. On the nearer approach of the ship, apparently awakened by the noise, it first rose fully six feet above the water, then sank quickly out of sight. At the distance of only a few yards I easily recognised it as the upper jaw of a Greenland Right Whale, and that part which originally attracted attention must therefors have been the tip of the animal's nose. When, where, and how the whales sleep is an interesting question which I do not propose discussing here: certainly it is a rare occurrence to see one asleep at the surface, especially in stormy weather. An anxious look-out was kept for two hours afterwards, without anything further being seen.

Reaching lat. 80° on the 26th, the ice was found to have undergone a remarkable change for the better, floes and fields were lying about quite unbroken in the sea. The same evening a whale was seen, which we succeeded in capturing. Falling over on its side during its death-struggle, it bent its body forwards until its caudal extremity was within some twenty feet of its chin. While in this strange position it spun round the centre of a circle, of which its body lay along by far the greater part of its circumference. In addition to the particulars regarding the capture, size, &c., of this and the other whales we captured, to be found in a Table appended, I may state that the tail of this one measured, transversely, 17 ft. 6 in.; antero-posteriorly along the median line 5 ft.; and that the smallest girth of the rump, 5 ft. 6 in., was obtained at the anterior commencement of the lobes of the tail.

During the following week we captured five whales; of these the smallest was that killed on May 28th. In proportion to its length — about 30 ft. — its head seemed remarkably short, certainly not more than one-fourth of the entire length; its skin was decidedly bluish black, almost azure-blue. Including those which we captured, we saw perhaps twenty whales, nearly all of small size. Except coming out below the ice, feeding and returning again, they seemed to be going in no particular direction. Strong gales prevailed from the northward; often the boats were quite unable to pull to windward, and sometimes had even difficulty in living in the short sharp sea. Imagine, therefore, the additional difficulty and danger of harpooning and lancing whales to keeping a boat above water in such weather. Frequent snow-storms and stinging frost made four or five hours in an open boat none the less uncomfortable under such circumstances. The water, grass-green in colour, sometimes thick and obscure, sometimes clear and transparent, contained abundance of surface life, *Calanus finmarchicus* being as usual by far the most abundant—next, perhaps, *Clio borealis*. Birds (principally Looms and Rotches), Narwhals and Floe-rats (*Phoca hispida*) were numerous.

Whether going to windward or to leeward it was observed that whales, when amongst much sea, invariably appeared heading to leeward, apparently by interposing their backs between their spiracles and the sea, preventing the access of water into their lungs during inspiration. In this our boats were more than once deceived, for several times, when pulling to leeward after a whale, which had dived heading in that direction, they were somewhat disgusted to find that, on its next appearance it was considerably to windward of its former position. In former voyages I have a distinct recollection of chasing whales to windward against a short sharp head-sea; once, at least, while personally taking a leading part in the pursuit, several times as an onlooker, the observation I made on these occasions was, that every time the whale appeared at the surface, invariably turning away from its path, it described a circle of no great extent, and on coming round again to its old course would continue swimming to windward. What appeared to me then a most eccentric-like evolution I am now of opinion was performed for the very same reason as on the occasions already mentioned, *viz.*, to prevent the access of water to the lungs during inspiration. The spiracles are semilunar openings about 12 in. long, placed longitudinally on the very summit of the head or crown, having their convexities turned towards one another and the mesial plane, their posterior extremities farther apart than their anterior, which are situated within 4 in. of one another. These openings can be opened and closed at pleasure, muscular effort, apparently, pulling their convex outer borders away from the mesial plane and their inner concave borders. These muscles relaxing, the spiracles close by the approximation of their own walls, and thus during sleep they are seen closed, and after death (post mortem rigidity having ceased) the spiracles are found rigidly closed.

In the following Table will be found the position of the s. s. 'Eclipse,' the surface temperature of the sea, and the temperature of air, at noon, on the different days on which any event of zoological interest is recorded as having occurred:—

Date.	Ship's Position.		Temperature.	
	Lat.	Long.	Surface of Sea.	Air.
April 23	62° 14′ N.	0° 25′ W.	47° Fh.	48° Fh.
,, 24	64° 38′	0° 25′	44°	39°
,, 25	64° 49′	2° 33′ E.	44°	34°
,, 26	66° 5′	0° 45′	42°	33°
,, 27	67° 55′	1° 53′ W.	41°	35°
,, 28	70° 14′	2° 23′	39°	32°
,, 29	71° 54′	2° 34′	32°	31°
,, 30	72° 38′	1° 49′	30·5°	34°
May 1	74° 20′	1° 29′	29·5°	27°
,, 6	76° 38′	0° 7′	29·5°	30°
,, 11	78° 0′	1°	29°	20°
,, 18	79° 57′	4° 20′ E.	30°	22°
,, 19	78° 53′	4° 6′	29·5°	27°
,, 21	78° 40′	1°	31°	27°
,, 26	79° 41′	2° 0′	31°	27°
,, 29	79° 24′	2° 2′	29°	16°

(To be continued.)

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

By Montagu Browne, F.Z.S.
Curator, Town Museum, Leicester.

(Concluded from Zool. 1886, p. 415.)

Class Reptilia.

Order Sauria.—Fam. Lacertidæ.

Lacerta agilis, Linn. Sand Lizard.—Harley writes:—"This species is liable to much variation in colour. It has been met with of a pale greenish yellow, with the back of an umber-brown colour; others of a darker hue, and others again variegated with black spots down the centre of the back. It is of limited distribution in the county, being mainly confined to Charnwood Forest and the adjacent woodlands."

Lacerta vivipara, Jacq. Common Lizard; "Scaly Lizard," "Viviparous Lizard."—Occurs generally in most parts of the county, and is common about Charnwood. Harley was informed by a correspondent that he had occasionally seen in the neighbourhood a species of Lizard which affected the leaves of brambles and other plants, its habits being described as similar to those of a Chameleon, especially when basking in the sun or intent on feeding; but it is well known that this is a common habit with *Lacerta vivipara*, and probably with most Lizards.

Fam. SCINCIDÆ.

Anguis fragilis, Linn. Blind-worm; "Slow-worm."—Resident and commonly distributed. There are specimens in the Museum at Leicester from Bradgate and Bardon Hill.

Order OPHIDIA.—Fam. COLUBRIDÆ.

Tropidonotus natrix (Linn.). Common Snake; "Ringed Snake."—Resident and commonly distributed. A large female specimen in the Leicester Museum measures a little over three feet. [We have seen one over five feet.—ED.]

Fam. VIPERIDÆ.

Vipera berus, Linn. Viper; "Adder."—Resident and generally distributed, but not so common, fortunately, as its harmless relative. Harley remarks, under date 1846:—"*Pelias berus* and *Coluber natrix* were abroad very early this season, *viz.* during the first and second week of March. On the 13th and 14th of that month we noted both reptiles in Bradgate Park. There are specimens in the Museum from many localities in the county, all of the dark variety.

Class BATRACHIA.

The following are all resident and generally distributed:—*Rana temporaria*, Linn.; Common Frog. *Bufo vulgaris*, Laur.; Common Toad. *Molge cristata* (Laur.); Great Warty Newt;

"Warty Eft," "Effet." *Molge vulgaris* (Linn.); Smooth Newt; "Common Effet," "Asker."

Class PISCES.

Order GANOIDEI.—Fam. ACIPENSERIDÆ.

Acipenser sturio, Linn.; Sturgeon.—A rare straggler of accidental occurrence. Harley says a specimen was taken in the Soar, below Loughborough, but gives no date. Some few years ago a small specimen was taken in the little River Smite near to Belvoir.

Order ACANTHOPTERYGII.—Fam. PERCIDÆ.

Perca fluviatilis, Linn. Perch.—Commonly distributed. In the Leicester Museum there is a cast of a specimen taken at Saddington by Mr. J. Benskin which weighed about three pounds. On July 19th, 1886, Mr. Smith presented one to the Museum taken at Aylestone which weighed two pounds two ounces. At Thornton, where it abounds, I have taken several specimens with blunt heads or rounded noses, evidently a malformation, which appears, however, persistent.

Fam. COTTIDÆ.

Cottus gobio, Linn. Miller's-thumb; "Bull-head."—Commonly distributed.

Fam. GASTEROSTEIDÆ.

Gasterosteus aculeatus, Linn. Three-spined Stickleback, "Robin," "Soldier," "Jack Bannel," "Tittle-bat," "Stuts." *G. pungitius*, Linn. Ten-spined Stickleback, "Tinker."—Both commonly distributed.

Order ANACANTHINI.—Fam. GADIDÆ.

Lota vulgaris, Cuv. Burbot; "Burbolt," "Eel-pout."—Rare. It has been occasionally taken in the Soar about Kegworth; and Harley saw one taken in an eel-net at Zouch Mills, near Loughborough.

Order PHYSOSTOMI.—Fam. CYPRINIDÆ.

Cyprinus carpio, Linn. Carp.—Not uncommon in pools such as those of Groby and Saddington.

Barbus vulgaris, Flem. Barbel.—Occurs occasionally in the

Soar, near its junction with the Trent and Derwent, and is frequently caught below Loughborough.

Gobio fluviatilis, Flem. Gudgeon.—Common in the Soar, and in various parts of the county. The largest I have seen have been taken at Thornton Reservoir.

Leuciscus rutilus (Linn.). Roach.—Commonly distributed. In the Leicester Museum there is a cast of a specimen, taken in Narborough waters, which turned the scale at two pounds.

L. cephalus (Linn.). Chub.—Generally distributed, attaining a good size. A specimen, weighing five pounds two ounces and a half, taken in the River Soar at Narborough by Mr. T. Lumb, Feb. 27th, 1883, and another weighing five pounds and half an ounce, taken at the same place and by the same angler, Feb. 6th, 1885, are in the Leicester Museum. Another taken at Aylestone, Feb. 6th, 1883, by Mr. A, Smith, weighed four pounds and a half.

L. vulgaris, Flem. Dace.—Generally distributed in sharp streams—"backwaters" of the rivers. A specimen weighing twelve ounces was taken by Mr. W. Benskin in the Soar near Barrow.

L. erythropthalmus (Linn.). Rudd; "Red-eye."—Occasionally met with in the Soar.

L. phoxinus (Linn.). Minnow.—Commonly distributed.

Tinca vulgaris, Cuv. Tench.—Not very common.

Abramis brama, Linn. Common Bream; "Yellow Bream."—Commonly distributed in the Soar, where, at Kegworth, I have seen many large-sized fish. One taken in this river weighed seven pounds.

A. blicca, Bl. White Bream; "Bream-flat."—Occurs in the Soar and Trent.

Alburnus lucidus, Häckel. Bleak.—Widely diffused.

Nemachilus barbatulus (Linn.). Loach; "Bearded Loach," "Stone Loach."—Generally distributed.

Cobitis tænia, Linn. Spined Loach; "Groundling."—Locally distributed. Has been met with in the Soar and Wreake. I took a specimen in a small stream at Aylestone on April 14th, 1883.

Fam. Esocidæ.

Esox lucius, Linn. Pike.—Commonly distributed, attaining a large size in ponds such as those of Bosworth, Saddington, and Naseby. In 1811 Harley saw a brace of Pike, taken in a pond at Leishley, the property of Mr. March Phillips, each of which weighed twenty-five pounds. I saw one weighing twenty-six pounds, which was captured in April, 1869, in Bosworth Pool. The MS. Donation Book at the Leicester Museum records, August 20th, 1872, the capture of one at Barrow-on-Soar, which weighed seventeen pounds and three-quarters, and measured three feet six inches in length. It was presented to the Museum by Mr. Noble, of Barrow.

Fam. SALMONIDÆ.

Salmo salar, Linn. Salmon.—Harley writes, "Found commonly in the Trent and Derwent at their confluence; in the Soar about Kegworth, and near Loughborough." At present, however, it must be regarded as rare, although I heard of one taken at Ratcliffe Lock, in 1883, which was said to have weighed twenty-six pounds.

Salmo fario, Linn. Common Trout; "Brook Trout."—Sparingly distributed in the county. At Bradgate, where it is strictly preserved, it is abundant, and attains a good size.

Thymallus vulgaris, Nilss. Grayling.—"Appears to be limited to the Soar and its confluence with the Trent."—Harley.

Fam. MURÆNIDÆ.

Anguilla vulgaris, Flem., Eel; and *A. latirostris*, Broad-nosed Eel. Both commonly distributed.

Fam. PETROMYZONTIDÆ.

Petromyzon fluviatilis, Linn., Lampern, "River Lamprey"; and *P. branchialis*, Linn., Small Lampern, "Pride." Both sparingly found in some of the streams of the county.

A FEW WORDS ON EUROPEAN BATS.

By the Rt. Hon. Lord Lilford, F.Z S.

Prompted by your remarks in the last number of 'The Zoologist,' and by the excellent plate of the Greater Horse-shoe Bat, I venture to offer to your readers a few notes on those species of the order Cheiroptera which I have met with in the European region. I may mention that I took up the study of Bats in the summer of 1870, and in a few days discovered that five species are tolerably abundant in the neighbourhood of Lilford, and that at least two more, which I have not been able satisfactorily to identify, are occasionally to be met with in the northern division of Northamptonshire. I have no work of reference at hand except Lord Clermont's 'Guide to the Quadrupeds and Reptiles of Europe,' so I adopt his arrangement and nomenclature. From the habits of the European Bats a close study of the animals in their natural state is almost impossible, but to my mind most attractive; I have no pretence to any special knowledge on the subject, and my only object in thus addressing you is the hope that my notes may induce some of your readers to turn their attention to this comparatively little-known branch of Zoology, and give us the result of their experiences in your Journal. To those who have as yet paid no attention to Bats, it may be useful to mention Dr. Dobson's exhaustive British Museum Catalogue of the Cheiroptera as the standard English work on the subject.

During my visit to Cyprus in the spring of 1875 I was informed by a fellow-countryman, who had resided for some years in the island, that a considerable amount of damage to fruit was there done by some large Bats: in spite of some search in likely localities we did not succeed in finding any of these animals during our five weeks' stay on the coasts of Cyprus; but a collector, whom I sent out shortly after the British occupation of the island, sent me some thirty specimens of *Cynonycteris collaris* in spirits. It is somewhat remarkable that the fruit-eating Bat of Cyprus should be of a different species to that of Egypt and Palestine, *C. ægyptiacus.* I believe that I am correct in stating that till the receipt of these Collared Fruit-Bats from Cyprus, the species had not been recorded from any locality nearer home than S. Africa. The Zoological Society have for many years past had more or less of this species alive in the monkey-house in the Regent's Park, where one or more young ones have been produced every year since 1870. I have a pair of these animals at Lilford; they are very tame, exceedingly cleanly in their habits, and seem to thrive upon almost any sort of fruit, with a decided preference for dates, bananas, grapes, and cherries.

Dysopes Rüppelii, Temm.—The only specimen of this very curious species that I have ever seen alive was brought to me in

Seville, in April, 1872, by a man who said that he found it clinging to the old brickwork of an aqueduct just outside the city wall on the road to Alcalá de Guadaira. I have received specimens from Genoa, and have reason to believe that it is by no means very uncommon in many parts of Italy and Slcily. I found it in the Museum of Palermo, and was informed that it was not rare in that neighbourhood.

Rhinolophus ferrum-equinum, Bonap. Faun. Ital.—I procured a few of this species alive from some sea-caves near Syracuse, in the spring of 1874. It is common in most parts of Italy, and, as far as my own observation goes, prefers caves or buildings to hollow trees. In England it is by no means abundant. In Spain it is extremely local, and not very common.

Rhinolophus euryale, Blasius.—This species, intermediate in size between the Greater and Lesser Horse-shoe Bats, I met with in Andalusia in tolerable abundance, and procured many specimens in Sicily from small caverns and fissures in ancient quarries. The fur of this species is of a lighter colour than that of either of the other two European Horse-shoe Bats, and lacks the rufous tinge which is generally to be observed in those species.

Rhinolophus bihastatus, Desm.*—I have received specimens of this Bat from South Devon, where I believe it to be much more common than is generally supposed. It abounds in Southern Spain, Sicily, and the neighbourhood of Algiers, in all which localities I have met with it hanging in clusters in caves and old buildings. The Horse-shoe Bats appear to be very savage and pugnacious, and other species are seldom to be met with in company with them. The flight of this genus is somewhat weak and fluttering, as compared with that of most European members of the order.

Vespertilio noctula, Desm.—This species, the largest of our British Bats, is common in Northamptonshire, inhabiting the cavities of old ash, elm, and beech trees in colonies of from six to upwards of twenty. It flies high, often out of gunshot range, and is seldom to be seen on wing after the end of August. The presence of these animals has often been betrayed to us by a constant twittering squeak issuing from holes in our old trees. I am inclined to think that many Woodpeckers, Starlings, and other hole-breeding birds are ousted from their homes by these Bats. In spite of many attempts I never could succeed in getting a Noctule to take food of any sort in a cage or box. I have found this Bat in every part of Spain that I have visited.

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* The Lesser Horse-shoe Bat. According to Dr. Dobson this should stand as *Rhinolophus hipposideros*, Bechstein, Naturg. Deutschl. p. 1194 (1801); *Rhinolophus bihastatus*, Geoffroy, Descript. de l'Egypte, ii. p. 132 (1812).—Ed.

Vespertilio murinus, Desm.—This Bat, whose claim to rank as a British species is, I believe, founded on the occurrence of a solitary individual in the precincts of the British Museum many years ago, is recorded as very common in France and Germany. The only living specimens that I have handled were one taken in a ruined house near Seville, and another brought to me, with some hundreds of another species, from a cave near Syracuse. A friend, whom I had asked to look out for Bats for me, wrote from Aix-les-Bains that he saw several thereabouts, "nearly as big as Woodcocks"; and when I was subsequently at that place I saw two or three very large Bats that were certainly not Noctules, and must, I think, have belonged to this species; unless this was the case, I cannot speak positively as to having seen this Bat on the wing. This animal is, in my opinion, one of the most repulsive in appearance and odour of the Bat family, being generally mangy in coat, and covered with parasites, from which, indeed, few of the European Bats are ever completely free.

Vespertilio Nattereri, Desm.—This species, though apparently very local, is by no means uncommon in the neighbourhood of Lilford; as far as I have been able to ascertain it seldom hunts for food at more than a few hundred yards distance from its diurnal retreats, though it is a comparatively strong flyer. I shot one on wing many years ago on the road in the village of Achurch, and, though I then knew nothing about Bats, noticed that it was a very different animal from the three species that swarm around the house at Lilford in the summer evenings; in 1870, when I began to collect Bats, I was told by our old fisherman, a native of Achurch, that whilst smoking his evening pipe at his cottage door he had often seen many Bats emerge from a crack in the stonework below the chimney of his nearest neighbour's abode; I asked him to try and catch some of them, and he brought me some twenty of this species a day or two after making the announcement; this was early in July, and a short time afterwards I received several more of the same species from under the roof of Pilton Church, which is a short quarter of a mile from Lilford. I tried in vain to keep some of these Bats alive, and sent two of them to the Regent's Park Zoological Gardens; but they all declined to feed, three or four of mine died, and were placed in spirits, and I liberated the survivors after a few days' captivity. I never met with Natterer's Bat anywhere but in the two localities above-mentioned; it is said to occur in Belgium, Eastern France, Germany, and other parts of Central and Eastern Europe.

Vespertilio serotinus, Desm.—Although I have never been able hitherto to obtain the Serotine in Northamptonshire, I feel certain that it occurs occasionally near Lilford; but as its mode of flight, general coloration, and make, very much resemble those of the Noctule, to which species adult specimens approach in the extent of wings, it is of course impossible to speak positively without having handled and examined a freshly-killed specimen. I have received specimens of this Bat from Sussex and Hampshire, and found it to be common in various parts of France and Central Spain. The Serotine, as far as my own observation goes, appears addicted to hollow trees in preference to caves or buildings. I saw some fifty or more of this species in a cage at the Jardin des Plantes in 1867, and was assured that they had been taken from old trees in the neighbourhood of Paris by wood-cutters. In many parts of Eastern Germany this Bat appears to be common. It flies high, and is very fast on wing.

Vespertilio Schreibersii, Desm. — Many of this species were brought to me alive from the caves and quarries near Syracuse in April, 1874, and I knocked one down with a carriage-whip as he flew in bright sunshine near the well-known Grotto del Cane, at a short distance from Naples. I also caught four specimens of this Bat with one of *R. euryale* in a dark chamber in Pompeii; this latter animal was devoured by the others as they were carried in a handkerchief from the exhumed city to Torre del Annunziata, where our yacht was lying. This is one of the most common Bats in Southern Italy: I have also received it from Genoa, and it is abundant in Southern Spain, especially in the neighbourhood of Seville.

Vespertilio pipistrellus, Desm.—This little animal is *the* Common Bat of our islands, and abounds in Northamptonshire as in most parts of England with which I am acquainted. I have met with it in Spain, and I think in Italy, but to anyone but an expert it is difficult to discriminate this from the following species.

Vespertilio Kuhlii, Temm.—Of this species I can only say that, if my identification is correct, I have fouud it not very abundantly in Spain, commonly in S. Italy, Sicily, and Corfu. I am informed that *V. vispistrellus*, Penn., *V. alcythöe*, and *V. albolimbatus*, Bonaparte, are only synonyms for this species.

Vespertilo mystacinus, Desm. — The only living specimens of this Bat that I have ever seen were three or four brought to me from the belfry of Tichmarsh Church, Norths., in 1870, and one that I picked out of the Avon below the bridge at Christchurch, Hants, in 1873; the latter little animal was making a fairly strong swim of it against a moderate stream. This so-called Whiskered Bat is the darkest in colour of the British species with which I have any acquaintance.

Plecotus auritus, Geoffroy. — The Long-eared Bat is exceedingly common in Northamptonshire, as in most parts of England, and may often be seen flying in broad daylight and sunshine, sometimes even in the depth of winter; it seems especially to affect the roofs of summer-houses, porches, and cattle-sheds; its presence in such localities is often betrayed by the wings of moths on the floor below its lurking-places. This is the only species of British Bat that I could ever succeed in keeping alive for any length of time; the two or three with which I made the attempt fed greedily upon live house-flies and other small winged insects, taking them eagerly from our hands; but they refuse mealworms, beetles, and every sort of raw meat. During the hybernation of these animals I frequently examined them very minutely, and could not detect any pulsation whatever, or the slightest stain on a small mirror applied close to the nostrils; but they would slowly recover animation when exposed to a heat of about 75° Fahr., and eat ravenously as long as I had any flies to offer them; one of these Bats lived for more than two months in a state of complete torpor in a temperature varying from about 40° to 60°, and eventually flew off on a warm morning in February, and commenced hawking for gnats on the sheltered side of the house as briskly as if it had been mid-summer.

Barbastellus communis, Bonap. I found this curious-looking little animal in great abundance in a ruined monastery in Arragon, at the foot of the Pyrenees, in the summer of 1867, and in smaller numbers in a similar locality at Pótes, in the Province of Santander, in 1876. I have also met with it in Switzerland. This Bat is generally supposed to be uncommon in England, but although I have at present no positive proof of the fact, I strongly suspect that it occurs about Lilford. It generally flies lower than any other Bat of my acquaintance, with a somewhat feeble and hesitating flight.

In conclusion, I may mention that, besides the species mentioned above as occurring in our islands, I find that Lord Clermont (on the authority, as I suppose, of Thomas Bell, 'Brit. Quad.') admits six other species, viz., *V. Bechsteinii*, Desm., *V. Leisleri*, Desm., *V. discolor*, Desm., *V. Daubentonii*, Desm., *V. emarginatus*, Desm., and *Plecotus brevimanus*, Bonap.*; but the simple truth is that very few English zoologists have studied, or at all events published the results of their studies of our Bats, and if my meagre remarks should induce any of your readers to turn their attention to this subject, I will hope that we may shortly have the benefit of "more light."

NOTES AND QUERIES.

MAMMALIA.

Young Otters in August.—On the 14th August last I had two young Otters sent me by a friend, who had taken them the previous evening. They were interesting on account of their very tender age, for I should think they were not more than a day old, if so much. A gamekeeper said he was sure they had "seen daylight" only a few hours, which was an error of observation, as the little creatures were of course blind. The first thing that struck me was their diminutive size, as they certainly were no larger than an ordinary kitten at the time of birth; in fact, I think I have seen very young kittens larger and more robust than these tiny Otters were, but their webbed feet and thick tail were characteristics not to be overlooked.

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* *Plecotus brevimanus*, Jenyns, is now generally admitted to be merely the young of *Plecotus auritus*, Linnæus. The nomenclature here adopted from Lord Clermont's 'Guide to the Quadrupeds and Reptiles of Europe' (1859) stands in need of considerable revision, and cannot be regarded as authoritative at the present day.—Ed.

They were of an uniform *grey* colour, and in this respect very unlike older individuals. They were deposited underneath some planks forming part of the floor of a boat-house, to which the female gained entrance by burrowing under the water into the bank, and then working upwards, as I believe is their usual wont. There was but little semblance of a nest, only a few green water-weeds having been collected together, and upon these the infants were reposing with their parent, who stoutly refused to leave her tender charge, and with a maternal courage which certainly deserved a better fate forfeited her life in their defence. Is August the usual time for young Otters, and are there usually two at a birth? [Young Otters have been found in almost every month of the year.—Ed.] My friend informed me that indications of the presence of Otters near the boat-house—by partly devoured fish—were abundantly evident for a long time previous to the capture of the above; and it is gratifying to all who take an interest in our comparatively few British wild quadrupeds that Otters are far from rare about the Hampshire Avon, and they naturally frequent those parts of the river where fish-preservation offers them the best chance of livelihood with the least amount of labour. I was not aware of the fact that Otters will kill and devour Wild Ducks when in the "flapper" state. Is it well known?—G. B. Corbin (Ringwood). [We have heeard on good authority of their killing and eeting Moorhens and also Water-rats.—Ed.]

Weasels killing Moles.—Apropos of the question whether Stoats and Weasels kill Moles (Zool. 1886, p. 456), I came upon the following note in 'The Field' of May 1st, 1886, which may perhaps be worth reprinting as bearing on the question. Mr. H. H. Simpson, of Bowdon, Cheshire, writes:—"In 'The Field' of April 24th a correspondent mentions the capture of a Weasel in a mole-trap, and asks whether it is a common thing for Weasels to hunt Moles. As there seems to be some doubt whether Weasels actually prey upon Moles or not, I may mention that I saw a Weasel run across the road near here carrying a Mole in its mouth, apparently with the greatest ease, for its head was held up high, and the Mole was quite clear of the ground. The Weasel with its burden disappeared down a hole, where it is reasonable to suppose that the Mole would be made a meal of." Another instance of a Weasel having been seen in the act of carrying a Mole was previously recorded in the same paper, July 9th, 1881. In this case the Mole was picked up by the person who witnessed the occurrence, and who shot the Weasel and had both animals stuffed. On the 7th May last my brother told me that he had a few days before found a young Weasel in a large mole-hill in some marshes at Leiston. It was apparently only just born, and he thinks it must have been the first of a litter, and that the mother, disturbed by his dog, probably escaped through some of the holes or runs of the Mole.—G. T. Rope (Blaxhall, Suffolk).

Bats in Winter.—It is not uncommon on mild sunny days in winter to see the Pipistrelle, *Vespertilio pipistrellus*, flying about during mid-day; but until the 2nd January inst., in Surrey, I never saw one out with the ground covered with snow and the thermometer at the time below freezing-point. There was a bright sun shining at the time, about noon, and I only saw the Bat fly round some three or four times.—L. H. Irby (Wadenhoe, Oundle).

Dormouse in a Woodpecker's Nest.—On the 25th June last I was surprised to find a Dormouse's nest in an old Woodpecker's hole in an oak. I had examined the hole not long before and found nothing in it, and when I saw pieces of dry grass I thought a Starling had taken possession; but on my poking with a bit of wire the two Dormice came out and ran up the trunk at a great pace. I often find their nests here in bushes,—F. H. Birley (Dorman's Land, East Grinstead).

BIRDS.

The Mediterranean Black-headed Gull on the Norfolk Coast.—On the 26th December last an adult specimen of *Larus melanocephalus*, a male by dissection, was shot on Breydon Harbour, near Yarmouth, and was brought to me about an hour afterwards. At first I did not recognise the species, but its white wings, with only the outer primary edged with black, its deep umber-brown legs and feet, and stout bill, convinced me that I had a rarity. On consulting the fourth edition of Yarrell's 'British Birds,' Mr. Howard Saunders' excellent description (vol. iii. p. 605) showed me that the specimen in question was the Mediterranean Black-headed Gull. It was examined in the flesh by Mr. J. H. Gurney, jun., Mr. Thomas Southwell, and Major Feilden. I believe that this is the first proprely authenticated specimen which has been procured in Great Britain, and I am glad that such an addition to the British Avifauna should have occurred in this county.—George Smith (Great Yarmouth).

[This bird was exhibited by Mr Howard Saunders at a meeting of the Zoological Society on the 18th January last.—Ed.]

Lesser Redpoll nesting in Surrey.—On the 20th May, about two miles from Reigate, I came across two pairs of Lesser Redpolls in a clump of willows They were much agitated, and soon betrayed the cause of their distress by clustering to a nest which contained one egg. It was placed in the fork of a willow about six feet from the ground. I think there are not many recorded instances of these birds breeding in Surrey.—F. H. Birley (Dorman's Land, East Grinstead).

Variety of the Wild Duck.—On December 10th I shot a pretty and curious variety of the Wild Duck, *Anas boscas*, from a pond in the park here. The bird was a male, and had been seen about the park for several days, in company with two ducks of the natural colour. It had the crown and a large patch on each side of the head of the usual colour; the rest of the head and neck white. The dark brown band on the upper part of the breast was absent, the ordinary grey colour of the under parts extending to the neck; belly, yellowish white; back, tail, and under tail-coverts of the usual colour; a few white feathers in the upper tail-coverts; wings white, with the exception of a few feathers in one of them.—G. H. Caton Haigh (Grainsby Hall, Great Grimsby, Lincolnshire).

Waxwing in Aberdeenshire.—In a small garden near the Lumphanan Railway Station, during the last fortnight in December, a solitary Waxwing was seen daily. It was very tame, suffering an approach within a few yards, and when scared did not fly far. It was feeding voraciously on the red berries of the Cotoneaster.—George Brown (Elsick House, by Stonehaven, Kincardineshire).

[The appearance of this occasional winter visitor is most uncertain and irregular. Sometimes we hear of flocks arriving, sometimes a winter will pass without one being seen or at least reported. The last we heard of was seen at Hickling in January, 1884, as recorded in 'The Zoologist' for 1885, p. 55.—Ed.]

Blue-throat in Norfolk—Correction of Error.—Allow me to correct a statement in 'The Zoologist' for 1886. The Blue-throated Warbler recorded, at p. 160, by Mr. J. H. Gurney, jun., as having been shot by Mr. G. Hunt on the Horsey sand-hills on Sept. 25th, 1885, was only a female Redstart. It was, moreover, on the Winterton sand-hills where Mr. Hunt "wiped my eye" at this bird; we were both rabbit-shooting and on the look out for Blue-throats, when the "fire-tail" of this bird when rising attracted my notice. Mr. Hunt shot a Black Redstart at West Somerton in October, 1885, and on the 19th December, 1886, a female or immature male Black Redstart came into Mr. Bonner's greenhouse at East Rudham, where it continued for two or three days until allowed to go free.—Maurice C. H. Bird (West Rudham, Norfolk).

Harlequin Duck on the Northumbrian Coast.—On December 6th I received in the flesh and in a perfectly fresh condition a Harlequin Duck, shot on Dec. 2nd off the coast of Northumberland, near the Farne Islands. The correspondent who kindly sent it to me tells me he never met with such a bird before, and that there were three swimming together close to the islands. He shot them all, but only succeeded in getting two of them. Probably the wounded bird became the prey of some large gull. My specimen is a young male, and probably a bird of the previous year, as the white patch of feathers near the carpal joint of each wing, the pure white spot behind the eye, the stripe on the neck, and the chestnut colouring on the sides are all clearly defined; there are many blue feathers among the brown on the back, and one of the scapulars on the right side has a broad white mark; the breast and underparts are mottled all over with pale brown and dingy white, much like those of a female Pintail. The eyes were brown, the beak lead-colour; the legs and feet yellowish brown, without the least tinge of blue. I believe the legs and feet of the Long-tailed Duck, which species has been most frequently mistaken for the Harlequin, are greyish blue in both sexes, and at all ages. The bird was in very good condition. It seems difficult to account for a bird which breeds not uncommonly in Iceland being so rare a visitor to Britain.—JULIAN TUCK (St. Mary's, Bucknall, Stoke-on-Trent).

Birds observed in North Devon.—A fine Buzzard was brought into Ilfracombe about the middle of August, having been trapped on the borders of Exmoor, and I heard that both this bird and the Raven (of which I saw recently stuffed examples) were still found in some numbers in that district. On the 16th, when on the Little Hangman, I saw half-a-dozen Choughs flying round the cliff below me. Walking up the East Lynn from the sea to Watersmeet I counted upwards of a dozen Grey Wagtails, but not one with a black throat; of Dippers I only saw two. The Wood Wren seemed common, especially in the oak woods at Clovelly. Stock Doves haunted the cliffs to the west of Ilfracombe, and probably bred in some likely looking holes and fissures. The only waders I came across were four Turnstones and a large kock of Curlews at Braunton Burrows on the 21st, and a Common Sandpiper at Barnstaple on the 19th; many, however, passed over on several nights, and I recognised Whimbrels, Redshanks, Ringed Plovers, and Common Sandpipers. I met with the Cormorant on three occasions; in each case a single bird and at widely distant localities. An adult Gannet came in sight on the morning of the 15th, but I did not see another. When off Mortehoe one morning we passed a large flock of Gulls fishing, chiefly Kittiwakes, with a few Herring Gulls and Lesser Blackbacks, the only occasion on which I saw any number together.—OLIVER V. APLIN (Great Bourton, near Banbury).

Scarcity of Fieldfares. — My experience upon the east coast last autumn recalls to my mind a note by Mr. J. Young (Zool. 1884 pp. 228), wherein he relates that during the winter of 1883-4, being in different parts of the counties of Monmouth, Gloucester, Wilts, Berks and Kent, he never saw a Fieldfare or Redwing; during the same period they were plentiful in North Oxon (Zool. 1884, p. 339). When I left home on November 15th last, Fieldfares and Redwings were here in numbers, and I noticed them from the train all up the Nene Valley as far as Peterborough. In two days, at Freiston Shore, Lincolnshire, the only Fieldfares noticed were a few which were heard flying over head after dark, and which may have been on migration, and during three weeks (Nov. 18th to Dec. 8th) spent in different parts of Norfolk—north and south—I did not see a single bird. In Lincolnshire I saw no Redwings, and in Norfolk only two or three on Nov. 19th, and a soliitary bird just over the Suffolk boundary a fortnight later. On returning to Oxon I found both species abundant, and though their numbers have diminished with the severe weather they have remained up to the time of writing. Perhaps the big hawthorn hedges of Oxon and North Hants are the attraction in these counties.—OLIVER V. APLIN (Great Bourton, near Banbury).

Curlew Sandpiper and Spotted Crake in Shetland.—A specimen of this bird (*Tringa subarquata*) was shot by Andrew John Garriock on the 11th August last, in a meadow on Tingwall parish. It was in company with several snipe, feeding among the high grass, and seemed very shy and uneasy in its movements. The only recorded instance of the previous occurrence of this species in Shetland is by Dr. Saxby, who states that "one was brought to him by a fisherman in the Island of Unst, on June 7th, 1859." I have also a Spotted Crake (*Crex porzana*) shot by the same person in the Island of Bressay, on October 7th last. So far as I know this is the first instance on record of its occurrence in Shetland. I have both birds now in my collection.—J. T. GARRIOCK (Lerwick).

Reported Occurrence of the Citril Finch near Brighton.—In 'The Zoologist' for December last (p. 490), Mr. Herbert Langton reported the capture of the Citril Finch, *Fringilla citrinella*, near the race-course at Brighton on the previous 14th October. A little correspondence on the subject has resulted in Mr. Swaysland of Brighton bringing the bird to London for inspection; and on submitting it to Mr. Sharpe, of the Natural History Museum, South Kensington, who has paid a good deal of attention to Finches, he pronounced it to be not the Citril Finch, but the Cape Canary, *Serinus canicollis*. At first glance the two species are not very unlike, and might be easily confounded in the absence of specimens for comparison. In fact, both these birds as, well as the wild Canary, *Serinus canaria*, or the Serin, *Serinus hortulanus*, have such a general resemblance in size and colour that it requires a practised eye to discriminate them offhand. As all four have been reported to have been taken in England at different times, and may be again referred to as occasional visitants, it may be well to note briefly some of their distinguishing characters. The Cape Canary, *Serinus canicollis*, a common cage-bird, has a bill like the Greenfinch, *F. chloris*, but smaller; the forehead and chin greenish yellow; nape and sides of neck grey; dorsal plumage greenish yellow; the outer web of all the wing-feathers strongly marked with the same colour. The Citril Finch, *F. citrinella*, in general coloration bears a close resemblance to this species, having like it a yellow forehead, chin, and underparts (though of a greener tinge), and a grey nape. But the dorsal plumage is of a greyer tone, and the wing-feathers not margined so vividly with yellow. The shape of the bill also is very different, being more like that of the Goldfinch (*Carduelis*). The Wild Canary, *Serinus canaria*, with a bill like *canicollis*, has none of the bright greenish yellow uniformly distributed over the dorsal plumage (except on the upper tail-coverts), and is of a much greyer tone, each feather with a darker centre; while the smallest of the four, the Serin, *Serinus hortulanus*, with the shortest and thickest bill of all (in proportion to its size), is at once recognizable by tbe great amount of striation on the flanks, as well as on the back and scapulars. As to whether the specimen of *Serinus canicollis* recently procured at Brighton was anything but an escaped cage-bird (as seems probable), opinions will doubtless differ; but it may be remarked that the plumage was in excellent order, and showed no traces of confinement.—J. E. HARTING.

Additions to the Avifauna of the Færoe Islands.—At page 487 of 'The Zoologist,' 1886, I have recorded, at second-hand, the capture of the Little Tern, *Sterna minuta*, in the Færoe Islands. Since then Herr H. C. Müller, of Thorshavn, has been kind enough to send me the specimen alluded to, and I find that it is an immature example of *Hydrochelidon nigra*, the Black Tern, so that the occurrence of *Sterna minuta* will have to be expunged, but the Black Tern is an equally interesting addition; this specimen was obtained on the island of Nalsae in the month of September, 1886. Herr Müller has likewise sent me specimens of *Larus minutus*, the Little Gull, obtained in the island of Nalsae on February 11th, 1886, and an example of *Upupa epops*, the Hoopoe, which was shot near Thorshavn on the 12th October, 1885; both additions to the Færoese list.—H. W. FEILDEN (West House, Wells, Norfolk).

Birds which Sing or Call at Night. — Mr. Flemyng's interesting note headed "Birds which Sing at Night" (Zool. 1886, p. 486), recalls the following circumstance. On March 10th, 1884, a fine bright night just before the full moon, and about the hour of midnight, I heard the following birds almost simultaneously: Song Thrush, Partridge, Redshank and Waterhen. Owing to the ignorance and destructive tendencies of gamekeepers, Owls have, I regret to say, become very scarce here, and in the early spring by far the noisiest bird we have at night is the Waterhen, whose strange nocturnal habit of leaving its usual haunts, and visiting places where one would least expect it to turn up, has given rise at times to various conjectures as to the origin of certain mysterious sounds heard in the dark, and 1 have more than once been startled by suddenly hearing overhead the loud harsh cry of this night wanderer in the most unlikely spots. The Norfolk Plover or Stone Curlew, *Œdicnemus crepitans*, though hardly a night "singer," keeps up while at its feeding-grounds (often a field of young turnips) an almost continuous screeching through the hours of darkness. Much bird music of the most attractive and interesting kind is probably unknown to a great proportion of mankind. The mighty rush of a large flock of Wigeon, for instance, heard on a still, frosty winter's night, is a sound which once heard is not easily forgotten. The well-trained ear of the flight-shooter at his post on the lonely marshes, becomes aware of a faint and indescribable, but all pervading, rushing sound, which seems to come from any or every direction; nearer and nearer it approaches, and again, perhaps, fades away into the distance, as the birds turn off in another direction; suddenly back they come, with the rush of a whirlwind, and the beautiful whistle, "whee-ou," of the mates (before blended with, and scarcely distinguishable from the sound of a multitude of wings), is heard again and again as the flock sweeps close overhead and again disappears into the darkness. But who has not enjoyed listening to the voices of our more familiar birds on a fine still evening in early spring, conveying to the ear, as surely do the swelling buds to the eye, unmistakable and ever welcome tidings and evidence of the gradual approach of the season when "the flowers appear on the earth, the time for the singing of birds has come, and the voice of the turtle is heard in the land." The distant note of the wheeling Peewits on their return to their nesting-ground; nearer as hand, perhaps, the jubilant evensong of the Thrush; the weird chattering and plaintive whistle of the Starlings on the topmost twigs of the tall elms, wonderful in variety and execution; the occasional note of deep solemn bass from the frogs in the nearest pool or ditch; and above all the fine loud burst of melody from the throat of the Blackbird, surely unsurpassed (as far as quality of tone is concerned) by the Nightingale itself, and in whose pure liquid notes the voice of the springtide itself seems to make itself heard. Such music fully compensates us for the annual loss of a few cherries and currants, and makes one wish that "collectors" and birds'-nesters were less abundant.—G. T. Rope (Blaxhall, Suffolk).

Varieties of the Brambling.—In 'The Zoologist' for 1885 (pp. 346, 389) were some notes on black-chinned Bramblings. Two of these birds, both having *white chins*, have occurred at Yarmouth—one about the 12th October, 1882, the other on the 3rd February, 1886. They both proved to be males, and present no variation in their plumage. This absence of colouring seems equally curious with the excess of it in those vigorous examples which have the chin and throat black. Both the birds were obtained by Mr. G. Smith. Although the extent of white is small, it is quite pure. Most birds seem more liable to be pied on the head than elsewhere, and in young Rooks a few white feathers on the chin are not unusual, as pointed out by Mr. R. M. Christy (Zool. 1886, p. 339), and I have seen it accompanied by white nasal bristles, the rest of the plumage being of the ordinary colour. The Goldfinch also has a white chin sometimes, and is then called a "cheverel." Prof. Newton has some interesting observations on the origin of the name (Yarrell's 'British Birds,' 4th ed., vol. ii. p. 124): he states that the extent of white varies greatly in different examples which he has examined. "Cheverels" in confinement are stated to breed "cheverels."—J. H. GURNEY, JUN. (Northrepps, Norwich).

Grey Phalaropes in Ireland.—The appearance of so many of these birds near St. Leonard's last October, as noted in 'The Zoologist' for January (p. 28), leads me to mention that Mr. Rohu told me on Oct. 20th last he had received a specimen from Mitchelstown, an inland locality; and on November 9th he mentioned that he had received another from Castletownsend, on the West coast of Cork. On November 18th I received a Grey Phalarope from Mr. Higginbotham, Dungarvan Lighthouse. Two others are doubtfully reported from Kingstown on October 3rd, not having been obtained. I believe the capture of the Red-necked Phalarope in Ireland has never yet been announced.—R. J. USSHER (Cappagh, Co. Waterford).

Bittern in Norfolk.—I beg to correct an error which appeared in 'The Zoologist' for December last. Mr. Gunn, in his "Notes from Norfolk and Suffolk," says I killed a Bittern at Aylsham on January 19th, 1885. It occurred at Foulsham, about twelve miles west of this place. As the visits of the Bittern are now unfortunately rare, it is well to be accurate with such notes. Part of my property in Aylsham lies in the valley watered by a small tributary of the Bure, and I should not like to have destroyed a Bittern so near the old breeding-grounds of the species, which if properly protected would now adorn its marshy solitudes. The bird in question was standing by the side of a pit near the middle of a grazing-ground, and allowed me and my son to approach within twenty-five yards. I did not fire; it flew slowly over the first fence, under which it alighted, and we held a consultation about killing it. Being in a dangerous locality, and I thought possibly wounded, I decided to shoot it.—R. J. W. PURDY (Woodgate, Aylsham).

Rare Birds in Ireland.—The following occurrences may be worth recording in 'The Zoologist.' Great Shearwater (*Puffinus major*), received on August 12th from Co. Sligo: the plumage being full of sand, and the bird much wasted, it had evidently been picked up dead on the sea shore. Spotted Redshank (*Totanas fuscus*), received Sept. 27th, having been shot near Sallins, Kildare: an immature bird of the year, its breast mottled with grey. Great Snipe (*Gallinago major*), shot in the first week of October by Major Hutchinson, of Rookville, near Drumsna, Co. Leitrim: this bird weighed eight ounces, and is the first genuine solitary snipe which in the course of twenty-five years has passed through our hands. Dotterel (*Eudromias morinellus*), two shot by Mr. St. George, near Clonmell, in September: one, an adult female, still shows the bare hatching spots, the other is an immature bird of the year. Great Spotted Woodpecker (*Picus major*): on December 3rd, an adult male was sent to us from Kilkeel, Co. Down, by Dr. Evans, and was by him generously presented to the Science and Art Museum; soon afterwards we received a female, which had been shot by Mr. Menzie's gamekeeper, in the woods of Glasslough, Co. Monaghan, the residence of Sir John Leslie. Sabine's Snipe (*Scolopax sabini*), one obtained on December 5th, in Kildare, by Mr. McSheehy, who has most liberally presented it to the Science and Art Museum. Another somewhat darker specimen we purchased in the Dublin market on December 27th.—WILLIAMS & SON (2, Dame Street, Dublin).

Estimated duration of life in an Albatross.—A curious incident is reported by the 'Hiogo News,' being communicated to it by Capt. Heard, of the British ship, the 'Duchess of Argyle.' When rounding Cape Horn, an immense Albatross was noticed following the ship. One day, as it hovered over the poop, it was noticed that an object about the size of a dollar was hanging round the bird's neck, and an attempt was at once made to catch it by means of a large hook baited by a piece of pork and allowed to drift astern. Several other Albatrosses were caught, but it was not until the third day that the one in question took the hook, which fixed itself firmly in its beak. On the bird being dragged on board it was found that the object hanging from its neck was a brass pocket compass-case, fastened with three strands of stout copper wire round the bird's neck. Two of the wires had worn through, and the box was thickly covered with verdigris. On its being opened there was found written on a piece of paper in faded ink the following:—"Caught May 8th, 1848, in latitude 38·6 S., 40·14 W., by Ambrose Cochran, of American ship 'Columbus.'" A fresh label, with the old and new dates of capture, was fastened round the bird's neck, and it was then released. It was measured before being allowed to fly, and was found to be twelve feet two inches between the tips of its wings. As the bird was probably four or five years old before being captured the first time, the interesting fact is proved that the natural life of an Albatross is at least fifty years.

Purple Sandpiper in the Channel Islands.—It may be of interest to note the occurrence of the Purple Sandpiper, *Tringa maritima*, in Jersey. I shot a bird of this species there on January 6th last, on the rocks at La Coupe, and on taking it to Mr. Caplin, taxidermist, was informed that only two or three Purple Sandpipers from this island had passed through his hands. This bird is not included either in Professor

Ansted's list or in Mr. Cecil Smith's, 'Birds of Guernsey.'—J. NICOLL (Le Vivier, St. Martin's, Jersey).

Moorhen nesting in a disused Punt.—While shooting on Sutton Heath, near Woodbridge, Suffolk, on October 12th, I noticed a curious spot for a Waterhen to build her nest; she had placed it upon the bow end of a disused punt which was lying nearly full of water at the edge of a pond, in full view of everyone passing. I drew the attention of my friends who were shooting with me to it, and we thoroughly investigated the matter. Upon making enquiries of the gentleman farming the land he said that when the nest was built the punt was rather more concealed by overhanging boughs.—E. C. MOOR (Great Bealings, Woodbridge, Suffolk).

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 20, 1887.—WILLIAM CARRUTHERS, F.R.S., President, in the chair.

Mr. John Benbow and Mr. Fiennes L. Y. Cornwallis were elected Fellows of the Society.

The President announced that H.R.H. The Prince of Wales had officially entered his name as an Honorary member on the Roll of the Society.

An oil portrait of Francis Masson, F.L.S., who was elected 1796, and made extensive collections of living plants in South Africa, was laid before the Fellows, and offered for their acceptance by the President. The announcement of this donation was received with acclamation.

A letter was read from Mr. Benjamin T. Lowne, referring to an exhibition by him of photographs from microscopical specimens of the retina of insects. One section represented the retinal layer detached from the opticon; other sections showed the basillar layer; thus practically affording evidence that the nerves terminate in end organs, *viz.*, rods placed in groups beneath the opticon,—a view promulgated by Mr. Lowne in his memoir, "On the Compound Vision and the Morphology of the Eye in Insects." (new ser. Zool. vol. ii. pp. 389-420).

Mr. J. W. Waller exhibited a large block of wood, part of an oak grown in Sussex. The wood having been sawn up lengthwise, it was found to contain a long tunnel and a large living larva of the longicorn beetle, *Prionus coriarius*.

Dr. John Anderson communicated a paper by the Rev. Thomas Hincks, *viz.*:—"Report on Hydroida and Polyzoa from the Mergui

Archipelago." The author states that though the material is moderate in amount, it nevertheless possesses interest in a fine mass of *Nellia occulata*, Busk (preserved in spirit), which proves rich in minute forms, both of Polyzoa and Hydroida. A new genus is described, provisionally ranked amongst the *Bicellariidæ*, and probably nearly related to *Bugula*. *Steganoporella smithii* is noted, the Mergui example being undoubtedly identical with the Cornish species. A variety of Smitt's *Schizoporella spongites* is described, forming a spreading crust, white and silvery, on stone. *Buskia setigera*, n. sp. is figured. The occurrence of a second species of *Buskia* has a positive interest as throwing further light on a peculiar kind of structure. Hitherto the genus has been represented by *Buskia nitens*, Alder, a smaller form than the present, which is not uncommon on the English coasts, and ranges from the Mediterranean to the extreme north (Davis Strait, Barents Sea, White Sea), and to the Queen Charlotte Islands in the North Pacific. *B. setigera* is comparatively large; and from the suberect habit of the cell, the ventral aperture extending from the bottom (or nearly so) to the top, is more apparent and more readily studied. The solid or chitinous portion of the zoœcium forms a kind of carapace closed in below by a membranous wall. The polypide stretches along the upper portions of the cell immediately beneath the chitinous shell, and issues at the top of the oral area. The structure, so far as it can be determined in spirit-specimens, is extremely simple; there seems to be no trace of a gizzard. In the setose portion of the tentacular sheath there is an interesting peculiarity. The setæ, before expanding, instead of being packed together so as to form a straight pencil, are seen to be subspirally arranged, some tending to one side, some to the other, and bear some resemblance to loosely twisted strands in a cord. As the tentacular corona moves upward and presses upon the base of the operculum, the setæ disentangle themselves and expand into the usual funnel-shaped figure. The setæ with the reversible portion of the sheath from which they rise equal the cell in length. The four setose appendages placed round the upper portion of the cell-margin form a very conspicuous and striking feature. When the polypide is exserted, they are thrown back and stand out from the cell; when it withdraws they are brought together and project at the summit. The tubular adherent processes given off from the lower part of the cell correspond with the spines round the base of the zoœcium in *B. nitens*. The cells are developed in large numbers on the creeping stem, and the habit of growth is luxuriant.

Membranipora favus, *M. marginella*, *Lepralia robusta*, *Porella malleolus*, with others, are among the new species fully entered into. Of Hydroids, *Obelia andersoni* and *O. bifurca* are new to science, the latter probably allied to the *bicuspidata*, Clarke, known from the Thimble Islands, coast of New England.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

December 21, 1886.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of November, 1886.

Mr. Howard Saunders exhibited and made remarks on a specimen of a hybrid between the Tufted Duck and the Pochard, bred in Lancashire in 1886.

Mr. J. Bland Sutton read a paper on Atavism, being a critical and systematic position of the Sponges. This was based on the recent researches on the *Hexactinellida*, *Tetractinellida*, and *Monaxonida* of the 'Challenger' Expedition, and on his own investigations on the rich Australian Sponge-fauna, particularly of the groups *Calcarea*, *Chalinidæ*, and Horny Sponges. A complete system of Sponges was proposed, and worked out down to the families and subfamilies, and all the principal genera were mentioned. An approximately complete list of the literature of Sponges (comprising the titles of 1446 papers), a "key" to the determination of the forty-six families, and a discussion of the systematic position of the Sponges were also contained in the paper.

Prof. Ray Lankester communicated a paper by Dr. A. Gibbs Bourne, of the Presidency College, Madras, on Indian Earthworms, containing an account of the Earthworms collected and observed by the author during excursions to the Nilgiris and Shevaroy Hills. Upwards of twenty new species were described.

Jan. 18.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1886, and called attention to a young male of the true Zebra, *Equus zebra*, purchased December 11th; and to a young male Indian Rhinoceros, presented by H.H. the Maharajah of Cooch Behar, through the kind intervention of Dr. B. Simpson, and received December 25th.

Mr. F. W. Styan exhibited and made remarks on a series of Chinese Birds' eggs which he had collected at Kiukiang and Shanghai.

Mr. Howard Saunders exhibited and read some notes on a skin of the Mediterranean Black-headed Gull, *Larus melanocephalus*, killed on Breydon Water, near Great Yarmouth, and sent for exhibition by Mr. G. Smith, of that town. This was stated to be the first absolutely authentic occurrence of this southern species on the British coasts.

Mr. Sclater exhibited and made some remarks on an example of a rare Amazon Parrot, *Chrysotis bodini*, from British Guina.

Mr. W. B. Tegetmeier exhibited and made remarks on three heads of the Sumatran Rhinoceros, *A. sumatrensis*, from Sarawak, Borneo.

Prof. Rupert Jones read a paper by himself, Messrs. H. B. Brady, and

W. K. Parker, on the Foraminifera dredged up on the Abrolhos Bank by H.M.S. 'Plumper' in 1857. The series contained examples of 124 species and notable varieties, and furnished results of definite value as regards the distribution of this group of animals.

Prof. G. B. Howes, read a paper on the skeleton and affinities of the paired fins of *Ceratodus*, and added observations upon the corresponding organs of the Elasmobranchii and other fishes.

A communication was read from Prof. T. Jeffrey Parker, of the University of Otago, New Zealand, containing an account of the anatomy of Rondelet's Shark, *Carcharodon rondeletii.*

A communication was read from the Rev. N. Abraham, containing an account of the habits of the Trapdoor Spider of Graham's Town, *Moggridgia dyeri.*

A communication was read from Dr. R. W. Shufeldt, containing notes on the visceral anatomy of certain Auks.

Mr. P. L. Sclater pointed out the characters of eight new species of birds of the family Tyrannidæ.

Mr. Sclater also described a new Ant-Thrush of the genus *Grallaria* from Ecuador, for which he proposed the name *Grallaria duboisi.*

Entomological Society of London.

Fifty-fourth Anniversary Meeting, January 19, 1887. — Robert M'Lachlan, Esq., F.R.S., President, in the chair.

An Abstract of the Treasurer's Accounts, showing a large Balance in the Society's favour, was read by Mr. Stainton, one of the Auditors; and the Secretary read the Report of the Council.

The following gentlemen were elected as Officers and Council for 1887:—*President*, Dr. David Sharp, F.Z.S.; *Treasurer*, Mr. Edward Saunders, F.L.S.; *Secretaries*, Mr. Herbert Goss, F.L.S., and the Rev. W. W. Fowler, M.A., F.L.S.; *Librarian*, Mr. Ferdinand Grut, F.L.S.: and as other Members of Council, Messrs. Robert M'Lachlan, F.R S.; Gervase Mathew, R.N., F.L.S.: George T. Porritt, F.L.S.; Edward B. Poulton, M.A., F.G.S.; Osbert Salvin, M.A., F.R.S.; Henry T. Stainton, F.R.S.; Samuel Stevens, F.L.S.; and J. Jenner Weir, F.L.S., F.Z.S.

The retiring President delivered an address, for which a vote of thanks to him was moved by Mr. E. B. Poulton, seconded by Prof. Meldola, and carried unanimously.

A vote of thanks to the Treasurer, Secretaries, and Librarian was moved by Mr. M'Lachlan, seconded by Mr. Stainton, and carried; and Mr. Goss and Mr. Grut replied.

A vote of thanks to the Council was proposed by Mr. Waterhouse, seconded by Mr. White, and carried.—H. Goss, *Hon. Sec.*

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